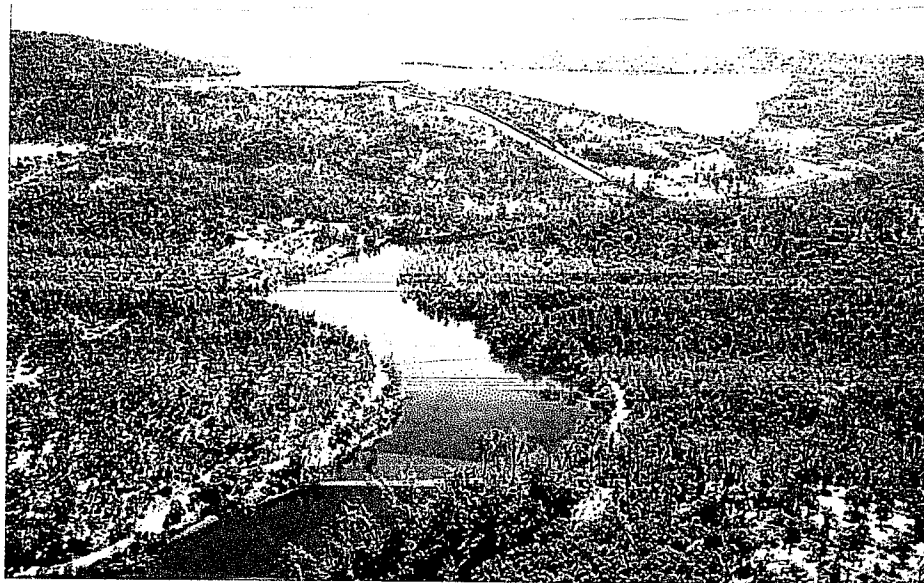


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OROVILLE FACILITIES RELICENSING  
FERC PROJECT NO. 2100



**DRAFT**  
**ENVIRONMENTAL IMPACT REPORT**



State of California  
The Resources Agency  
Department of Water Resources

May 2007

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## **4.7 RECREATIONAL RESOURCES**

This section presents combined results from recreation relicensing studies that summarize the components of the affected environment. The affected environment, including the surrounding regional area (Study Plan R-14 [SP-R14], Assessment of Regional Recreation and Barriers to Recreation), as well as recreation lands, sites, and activity types available at Lake Oroville are discussed (SP-R10, Recreation Facility Inventory and Condition Report) in this section. Recreation use levels for the various activities are also presented (results from SP-R9, Existing Recreation Use). The existing recreation management structure (results from SP-R5, Assessment of Recreation Areas Management) is also discussed for each of the geographical areas within the FERC Project boundary.

### **4.7.1 Regional and Project Recreational Setting**

This section provides a description of the overall regional and Oroville Facilities' recreational setting, and a discussion of the recreational facilities' role in meeting regional and local recreation needs, to provide context to the subsequent description of the recreation opportunities and facilities provided within the project area.

#### ***4.7.1.1 Regional Setting***

Reservoirs of various sizes are numerous in Northern California, offering recreationists many choices in destinations, settings, and activities. The 2 largest reservoirs (in terms of surface area) in the state are within a 2-hour drive of Oroville: Shasta Lake, with 29,500 acres, and Lake Almanor, with 27,064 acres. Both of these reservoirs are in attractive mountainous settings. Three reservoirs in the region are similar in size to Lake Oroville: Folsom Reservoir (12,000 acres), Lake Berryessa (21,000 acres), and Trinity Lake (16,535 acres). Smaller reservoirs (less than 5,000 acres) are more numerous and include Black Butte Lake, Bucks Lake, Bullards Bar Reservoir, Butt Valley Reservoir, East Park Reservoir, Englebright Lake, Indian Valley Reservoir, Lake Pillsbury, Lake Spaulding, Little Grass Valley Reservoir, Stony Gorge Reservoir, SWP Upper Feather River reservoirs (Antelope, Frenchman, Davis), and Whiskeytown Lake. These water bodies range in surface acreage from 698 acres (Lake Spaulding) to 4,700 acres (Bullards Bar). The region also offers 2 large and well known natural lakes: Lake Tahoe (122,200 acres) and Clear Lake (40,000 acres).

Many of these other lakes and reservoirs have facilities similar in type to Lake Oroville's and offer similar recreation experiences, activities, and opportunities. All of these regional water bodies have boat launching facilities and campgrounds. Lake Oroville is unique in offering floating campsites and equestrian trail-riding combined with equestrian camping.

#### ***4.7.1.2 Project Setting***

The Oroville Facilities are located at the edge of the foothills of the Sierra Nevada and on the eastern margin of Sacramento River Valley. Lake Oroville sits above the city of

Oroville and is surrounded by steep slopes with mixed oak and conifer woodlands. Several hills and ridges rise from 1,000 to 2,000 feet (ft) or more above the reservoir. Aside from Oroville Dam and developed recreation areas, most of the surrounding lands are undeveloped and natural appearing. The reservoir has narrow and winding forks, and has a surface area of over 15,000 acres at the full pool elevation of 900 ft above mean sea level (msl), making it the fourth largest reservoir in California in surface acres after Shasta Lake, Lake Almanor, and Lake Berryessa.

Water from Lake Oroville is released from Oroville Dam to the Diversion Pool, which winds about 4.5 miles between steep wooded hillsides. Thermalito Diversion Dam diverts most of the water released to the Diversion Pool down a 10,000-foot-long canal to Thermalito Forebay, a 630-acre hourglass-shaped reservoir sitting at the base of low-lying grass-covered hills. Water passed to the Thermalito Forebay in turn flows through a powerhouse and canal to the 4,300-acre Thermalito Afterbay, a broad and shallow reservoir surrounded on two sides by a low earthfill dam and by flat to gently rolling grasslands. Water is discharged into canals at several Thermalito Afterbay locations for agricultural use. Water not diverted from Thermalito Afterbay is released back to the Feather River through the Thermalito Afterbay Outlet, near the southeast corner of the reservoir.

Water not routed through Thermalito Forebay and Thermalito Afterbay from the Diversion Pool passes through the Low Flow Channel (LFC) of the Feather River, the 9-mile-long section of the river upstream of the Thermalito Afterbay Outlet. The first half mile of the LFC is occupied by the Fish Barrier Pool, a small reservoir formed by the Fish Barrier Dam at the Feather River Fish Hatchery. The LFC flows between levees, passing near downtown Oroville and residential areas before entering the Oroville Wildlife Area (OWA). The main management unit of the OWA consists of over 5,000 acres of land on both sides of the Feather River and is dominated by gravel and cobble tailing piles interspersed with cottonwood and willow-lined ponds. Thermalito Afterbay and surrounding lands are managed as a part of the OWA. The FERC Project boundary terminates about 5 miles downstream of the Thermalito Afterbay Outlet, at the southern end of the OWA.

The climate in the project area follows a Mediterranean pattern, with hot dry summers and cool wet winters. Summer high temperatures are typically in the 90s (degrees Fahrenheit [°F]) and may exceed 100°F, while winter high temperatures average in the mid 50s. Nearly all of the precipitation in the project area occurs during the late fall, winter, and early spring months, with November-through-March precipitation averaging about 5–6 inches per month.

### **Importance of Recreational Opportunities/Facilities to the Public**

The project area is a regional draw for recreationists, with Lake Oroville being one of the largest reservoirs in the state, and with the excellent fishing in Lake Oroville and the Feather River during annual salmon and steelhead runs. However, there is also heavy local use of Lake Oroville and other project facilities, including a significant amount of off-season use. The predominantly local use is attributable to the close proximity of the

city of Oroville and surrounding communities to the southern end of Lake Oroville and to the downstream areas. Many recreation areas are within a few minutes drive of these communities, and some residential areas are immediately adjacent to developed recreation facilities. Lake Oroville is also the closest reservoir for residents of other Butte County cities such as Paradise and Chico. Over one-half of those surveyed on-site for the Recreation Surveys (SP-R13) were from Butte County, demonstrating the importance of the project area to local residents. Some of the facilities do not currently have user fees, such as car-top boat ramps, the Lake Oroville Visitors Center, boat launching and day use facilities at Thermalito Afterbay, and all areas of the Diversion Pool and the OWA. Remaining developed areas typically have user fees that conform to those imposed at other State Recreation Areas.

#### **4.7.2 Public Recreational Access and Facilities**

The existing Oroville Facilities host a wide variety of recreation opportunities. The major components of the Oroville Facilities that host recreation are Lake Oroville, the Diversion Pool, Thermalito Forebay, Thermalito Afterbay, and the OWA. Most of a nearly 14-mile stretch of the Feather River downstream of the Diversion Pool is also within the FERC Project boundary. The upper 9 miles of this stretch is the LFC of the Feather River, from the Diversion Pool to the Thermalito Afterbay Outlet. Nearly 5 miles of the river below the outlet are also within the FERC Project boundary. A description of access to these project areas and a description of project facilities and recreational opportunities provided are included below. Table 4.7-1 summarizes the existing recreation facilities within the project area.

##### ***4.7.2.1 Formal and Informal Public Access to the Project Area***

Most access to the project area is through formal roads; informal access is generally limited to residential areas. The access to Lake Oroville, as well as to the other geographic areas within the project area, is discussed below.

#### **Access to Lake Oroville**

Three major highways—State Routes (SR) 70, 99, and 162—provide road access to Lake Oroville. Two major interstate highways—Interstate 5 (I-5) and I-80—connect to these State highways. SR 70 is a two- to four-lane highway that runs north/south between Sacramento and the city of Oroville and turns northeast/southwest a few miles north of Oroville. SR 70 crosses the West Branch arm of Lake Oroville before continuing north to Quincy. SR 99 is a two- to four-lane highway that runs primarily north/south and roughly parallel to SR 70 and I-5, providing an additional route between the Sacramento area and Red Bluff. SR 99 northbound connects Chico to Red Bluff and southbound connects Chico to Sacramento. SR 162 is a two-lane highway that runs east/west between I-5 and the city of Oroville. The road continues east through the city of Oroville before crossing the reservoir at the mouth of the Middle Fork arm. The city of Oroville is 42 miles from I-5. Generally, the major recreation areas are easily accessible from these highways; however, the rugged terrain and limited public road network makes accessing remote forks of Lake Oroville more difficult.

**Table 4.7-1. Recreation facilities within the Oroville project area.**

Facility Type	Name	
<b>Campgrounds</b>	<b><i>Drive-In Campgrounds and Camping Areas</i></b> <ul style="list-style-type: none"> <li>• Bidwell Canyon Campground</li> <li>• Lime Saddle Campground</li> <li>• Lime Saddle Group Campground</li> <li>• Loafer Creek Campground</li> <li>• Loafer Creek Group Campground</li> <li>• Loafer Creek Horse Campground</li> <li>• North Thermalito Forebay "En Route" Recreational Vehicle Campground</li> <li>• OWA Primitive Camping areas</li> </ul>	<b><i>Boat-in Campsites (BICs) and Floating Campsites</i></b> <ul style="list-style-type: none"> <li>• Goat Ranch BIC</li> <li>• Foreman Creek BIC</li> <li>• Craig Saddle BIC</li> <li>• Bloomer Cove BIC</li> <li>• Bloomer Knoll BIC</li> <li>• Bloomer Point BIC</li> <li>• Bloomer Group BIC</li> <li>• Floating Campsites (ten distributed in various Lake Oroville locations)</li> </ul>
<b>Day Use Areas (DUAs)</b>	<ul style="list-style-type: none"> <li>• Loafer Creek DUA</li> <li>• Oroville Dam Overlook DUA</li> <li>• Diversion Pool DUA</li> </ul>	<ul style="list-style-type: none"> <li>• Model Aircraft Flying Facility</li> <li>• OWA – Thermalito Afterbay Outlet</li> </ul>
<b>Boat Ramps (BRs)</b>	<b><i>BRs with DUAs</i></b> <ul style="list-style-type: none"> <li>• Bidwell Canyon BR/DUA</li> <li>• Lime Saddle BR/DUA</li> <li>• Monument Hill BR/DUA</li> <li>• North Thermalito Forebay BR/DUA</li> <li>• South Thermalito Forebay BR/DUA</li> <li>• Spillway BR/DUA</li> </ul>	<b><i>BRs without DUAs</i></b> <ul style="list-style-type: none"> <li>• Thermalito Afterbay Outlet BR</li> <li>• OWA unimproved BRs</li> <li>• Wilbur Road BR</li> <li>• Larkin Road Car-top BR</li> <li>• Enterprise BR</li> <li>• Foreman Creek Car-top BR</li> <li>• Stringtown Car-top BR</li> <li>• Dark Canyon Car-top BR</li> <li>• Nelson Bar Car-top BR</li> <li>• Vinton Gulch Car-top BR</li> </ul>
<b>Trails and Trailheads</b>	<b><i>Trails</i></b> <ul style="list-style-type: none"> <li>• Bidwell Canyon Trail</li> <li>• Wyk Island Trail</li> <li>• Chaparral Interpretive Trail</li> <li>• Dan Beebe Trail</li> <li>• Brad Freeman Trail</li> <li>• Loafer Creek Loop Trail</li> <li>• Loafer Creek Day Use/Campground Trail</li> <li>• Roy Rogers Trail</li> <li>• Potter's Ravine Trail</li> </ul>	<b><i>Trailheads</i></b> <ul style="list-style-type: none"> <li>• Saddle Dam Trailhead</li> <li>• Powerhouse Road Trailhead</li> <li>• Lakeland Boulevard Trailhead</li> <li>• East Hamilton Road Trailhead</li> <li>• Tres Vias Road Trailhead</li> <li>• Toland Road Trailhead</li> </ul>
<b>Special Use Facilities</b>	<ul style="list-style-type: none"> <li>• Feather River Fish Hatchery</li> </ul>	<ul style="list-style-type: none"> <li>• Lake Oroville Visitors Center</li> </ul>

Source: EDAW 2004

**Access to the Diversion Pool, Thermalito Forebay, Thermalito Afterbay,  
the Feather River, and the OWA**

The Diversion Pool is accessible via Cherokee Road off of Table Mountain Boulevard and SR 70. A gravel road (known locally as Burma Road) runs alongside about 1 mile of the northwest shoreline and provides access to the pool for anglers and car-top boaters and trail access at the terminus of the road for hikers and bike riders. (During the recreation study period, this trail was designated for multiple use.) Thermalito Forebay is accessible via SR 70, with the North Forebay Boat Ramp (BR)/Day Use Area (DUA) located immediately adjacent to the highway. Local roads provide access to the two developed sites at the north and south ends of the Forebay. Thermalito Afterbay is accessible via both SR 99 and SR 162. SR 99 runs parallel to the western side of Thermalito Afterbay and SR 162 crosses Thermalito Afterbay and divides it into north and south parts. SR 162, along with Larkin Road along the east side of Thermalito Afterbay, provides immediate access to the three developed facilities on Thermalito Afterbay. The OWA is accessible via gravel roads off of SR 162 to the north, SR 70 and Pacific Heights Road to the east, and Larkin Road to the west. There are no paved roads that enter the OWA; all roads are gravel and generally run atop elevated levees and former railroad beds.

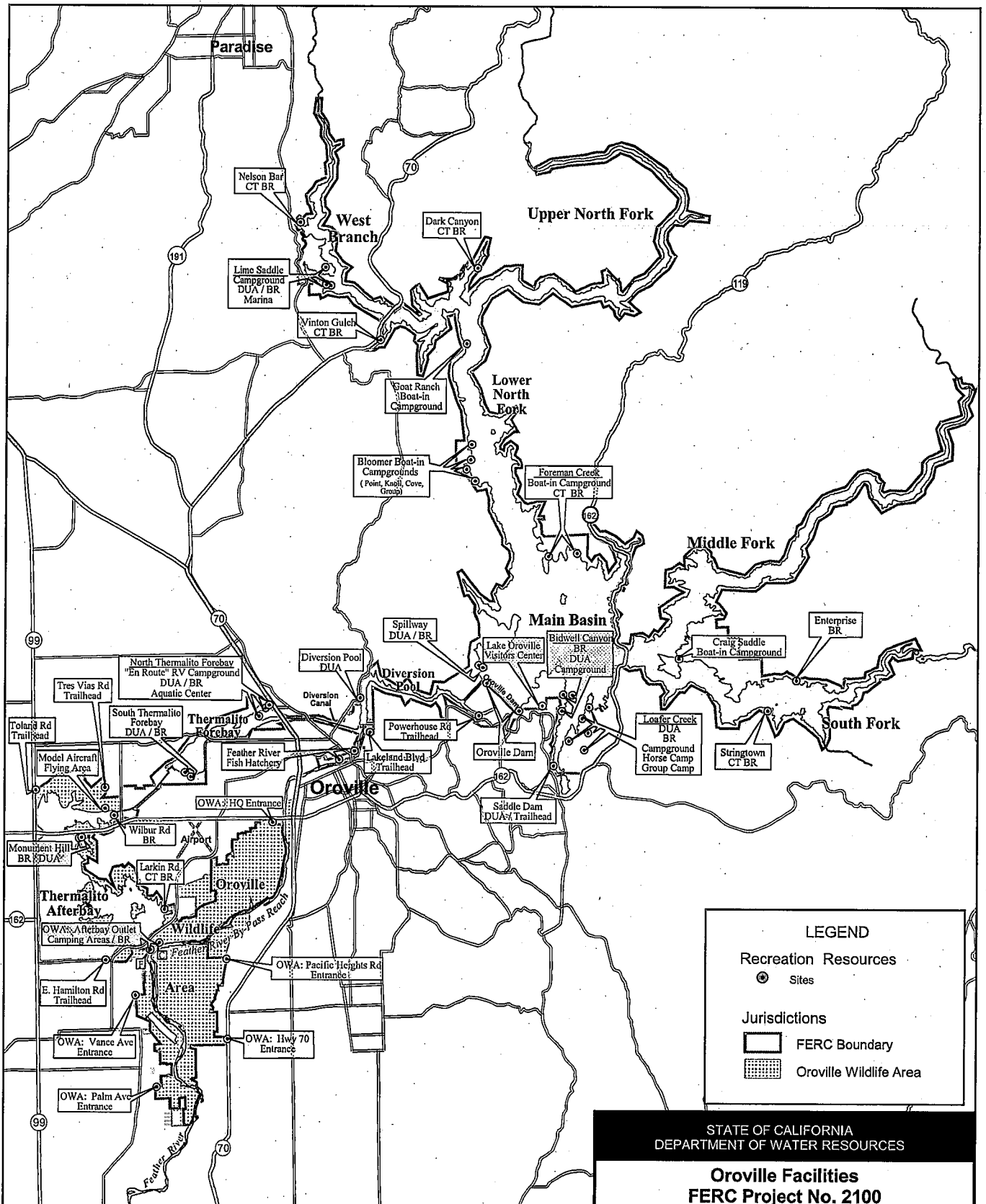
***4.7.2.2 Facilities and Opportunities in the Project Area***

The project area provides a wide range of facilities and accompanying recreational opportunities. A description of the facilities and opportunities at Lake Oroville, the Diversion Pool, Thermalito Forebay, Thermalito Afterbay, and the OWA is provided below (see Figure 4.7-1).

**Lake Oroville**

Lake Oroville is one of the largest reservoirs in California, with over 15,000 surface acres and 167 miles of shoreline at full pool. The reservoir elevation fluctuates more than 100 ft on average each year and can fluctuate 150 ft or more some years. The amount of fluctuation depends largely on the amount of winter precipitation in the watershed and resulting spring inflow into the reservoir. The reservoir and the lands and recreation facilities surrounding the reservoir are part of Lake Oroville State Recreation Area (LOSRA), managed by DPR. There are major recreation facilities at Lime Saddle, Spillway, Bidwell Canyon, and Loafer Creek. The Lime Saddle area is located on the western shoreline of the West Branch (of the North Fork Feather River) arm of the reservoir. The recently improved Spillway Recreation Area is adjacent to the Oroville Dam spillway, at the north end of the dam and at the southwest corner of the reservoir. Bidwell Canyon is located at the southern end of the reservoir. The Loafer Creek Recreation Area is the largest and most diverse recreation complex on the reservoir, located directly across Bidwell Cove from the Bidwell Canyon area.





Source: DWR GIS / EDAW 2003



Original Scale 1 : 190,080  
1" = 3.0 miles

**LEGEND**

Recreation Resources  
 ● Sites

Jurisdictions  
 [Solid Line] FERC Boundary  
 [Grid Pattern] Oroville Wildlife Area

STATE OF CALIFORNIA  
DEPARTMENT OF WATER RESOURCES

**Oroville Facilities  
FERC Project No. 2100**

**Figure 4.7-1  
Project Area and  
Associated Recreation Sites**



## Boating

Boating facilities at Lake Oroville include two full-service marinas and five boat ramps. The two concessionaire-operated marinas are located at Lime Saddle and Bidwell Canyon. They offer long- and short-term moorage and covered and open dock slips as well as boat rentals, gas, pump-out stations, and small stores with bait and tackle and convenience goods. There is also a restaurant/bar at the Bidwell Canyon Marina. The major launch ramps are located at Bidwell Canyon, Spillway, Lime Saddle, and Loafer Creek. The Bidwell Canyon ramp is a multi-lane boat ramp with parking for more than 200 vehicles and boat trailers. The Spillway area contains the largest boat launching facility on the reservoir, with ramps and parking areas at two levels to accommodate seasonal water level changes. The upper level ramp has 12 lanes with 3 floating docks and a parking area, providing space for 350 vehicles with boat trailers and more than 100 single vehicles. The lower level ramp provides 8 launch lanes and 3 floating docks, along with additional parking close to the ramp. The Lime Saddle ramp is a multi-lane boat ramp with parking for several hundred vehicles and boat trailers. The Loafer Creek ramp is a seasonal, multi-lane boat ramp with a floating dock and parking for nearly 200 vehicles and trailers. Each of the major ramps provides restrooms, and all but Loafer Creek provide fish cleaning stations for anglers.

In addition to these major ramps, the 2-lane Enterprise ramp provides seasonal launching with parking for 40 vehicles and trailers on the South Fork arm of the reservoir, primarily serving nearby rural residents. There is a new vault restroom at this site.

There are also five car-top boat ramps scattered around the reservoir that provide for small-boat access to the water and are also used for swimming, bank fishing, and picnicking. Most of these facilities are situated on more remote parts of the reservoir and provide a less-developed setting than the main boat ramps. Along with occasional hand launching of canoes and kayaks, the sites are used for a limited amount of trailer launching, mostly of small fishing boats, although this is not officially permitted at some sites. No boarding docks are provided, and parking is primarily undeveloped roadside parking. Most areas have pit toilets. Use levels are generally low to moderate. Most car-top ramps are improved (concrete) at their upper elevations, but lower reaches are simply abandoned roads that are not maintained.

Seven two-stall floating toilets anchored at various locations around the reservoir provide for the sanitary needs of boaters.

A limited amount of whitewater boating activity occurs on the Big Bend area of the North Fork Feather River when Lake Oroville reservoir pool levels are sufficiently low to expose several miles of river. (This area forms the Upper North Fork arm of the reservoir when water levels are higher.) Generally, a sufficient length of the run is exposed during the fall months (when the run is normally used) only during dry or critically dry water years. Even when several miles of the river are exposed, paddlers are faced with an equally long or longer flat water paddle after completing the run to

reach the takeout at the Dark Canyon Car-top BR. Paddlers who boat the Big Bend run put in just upstream of the project area boundary.

A few expert-level whitewater paddlers are reported to make the Class V Bald Rock Canyon run on the Middle Fork Feather River. The run begins outside the project area, several miles upstream of the Middle Fork arm of the reservoir, and terminates at the reservoir. Paddlers are required to make a several-hour-long flat-water paddle to take out at the Bidwell Bar Bridge or the Loafer Creek boat ramp.

On June 27, 2005, DWR staff investigated an algal bloom reported on the Middle Fork Arm of Lake Oroville. The water level at the Merrimac station was fairly low and the amount of attached algae in the water at the site appeared to be very high. Staff boated up the Middle Fork Arm and reported seeing algae pushed by the wind against the shore near Nutmeg Creek. This algal mass eventually expanded so that by the time they reached the 90-degree turn at the north end of the arm, the entire waterway was covered.

The algae were identified as the blue-green algae *Anabaena flos-aquae*. Blue-green algae are actually a type of bacteria called cyanobacteria that grow in water and are photosynthetic. Blooms occur when algae that are normally present begin to reproduce rapidly, typically a result of warm water and slow-moving waters that are rich in nutrients. The algal bloom did not affect recreation activities within the FERC Project boundary and it was unnecessary to place booms surrounding the algal bloom. Within a short amount of time, the algal bloom had dissipated.

### Day Use

There are day use areas at Lime Saddle, Spillway, Loafer Creek, and Bidwell Canyon near the boat launch facilities, each providing picnic sites and restrooms (shared with the boat ramp). The Bidwell Canyon DUA is centered on a historic bridge and tollhouse that have been relocated to the site and includes a short loop trail. This site includes new interpretive exhibits in the tollhouse.

The largest DUA is at Loafer Creek, with 30 picnic tables and numerous barbeque grills set beneath mature oaks. Amenities include bathrooms and showers and a popular swimming access when the reservoir is above 850 ft. The day use facilities at Spillway overlook the boat ramp and the main basin of the reservoir and consist of several picnic table sites beneath shade structures and lawn areas. Potable water and flush toilets are provided. The day use sites at Lime Saddle also overlook the boat ramp, but are less developed.

Picnic tables are provided at each end of the crest of Oroville Dam, where visitors come to enjoy expansive views of the reservoir and the Sacramento Valley. The mile-long crest is popular with walkers, joggers, and bike riders. Parking and toilets are available at the entrance to the dam crest road. Several years ago, California poppy seeds were broadcast across the downstream face of the Oroville Dam.

The Lake Oroville overlook located off the Oro-Quincy Highway (SR 162) was improved and a new California Department of Transportation specification fence and automobile safety barrier were installed. In addition, a new interpretive panel features a project area map. Most other shoreline day use at Lake Oroville occurs at the car-top boat ramps described above, where non-boating visitors picnic, swim, and fish from the shoreline.

### Camping

All the developed campgrounds in the project area are located at Lake Oroville: at Lime Saddle, Loafer Creek, and Bidwell Canyon. The campground at Lime Saddle, constructed on a peninsula across from the boat ramp and marina, has 45 family sites (15 are full-hookup recreational vehicle [RV] sites), restrooms, and showers. The Loafer Creek Campground has 137 tent/RV sites (no hookups), showers, and restrooms. The Bidwell Canyon Campground has 75 full hookup sites for both tent and RV camping, showers, and restrooms. There are group campgrounds at Lime Saddle (6 sites) and Loafer Creek (6 group sites) and an equestrian campground at Loafer Creek (15 sites).

The Loafer Creek equestrian campground is a specialized facility, with a horse washing station and horse tethering and feeding stations near each campsite. Recent improvements include paving the access road, adding new feeder boxes, installation of pipe corrals, and a 50-ft round exercise pen.

Self-contained RVs can use a portion of the Spillway's upper parking lot for overnight "en-route" stays. Unique to the Oroville Facilities are ten floating campsites anchored in several arms of the reservoir. Each is a two-story structure with tent/sleeping space, a gas grill, table, sink, restroom, and storage area. Camping boaters also have access to four primitive boat-in camp areas with dozens of designated tent sites, each with picnic tables and fire rings, and vault toilets.

### Trails and Trailheads

There are several trails near Lake Oroville, primarily in the Bidwell Canyon and Loafer Creek areas, and a trail along the southwest shoreline of the reservoir with the trailhead at the Spillway BR/DUA. Two trails in the Loafer Creek area, the Roy Rogers Trail (4.0 miles) and Loafer Creek Loop Trail (3.2 miles), are limited to equestrian and hiking use only. Hikers and bike riders may use the Loafer Creek Day Use/Campground Trail (1.7 miles) and the service road linking the equestrian camp to Saddle Dam and the Bidwell Canyon area. The Bidwell Canyon area includes the Bidwell Canyon Trail (4.9 miles) for bike riders and hikers, and the roughly-parallel Dan Beebe Trail (14 miles) for equestrians and hikers. The Potters Ravine Trail (8.2 miles) starting at the Spillway BR parking lot is available to all user types. The Wyk Island Trail (0.2 mile) is associated with the Bidwell Canyon DUA and is for pedestrians only. The 0.2-mile Chaparral Trail is an interpretive trail next to the Lake Oroville Visitors Center.

The Saddle Dam Trailhead at the south end of Lake Oroville is primarily used by equestrians. It provides access to the Dan Beebe Trail in the Bidwell Canyon area and, by crossing the Saddle Dam, to the Loafer Creek Loop Trail and Roy Rogers Trail in the Loafer Creek area. Recent improvements at the site include regrading and adding gravel to the parking area, installation of picnic tables, installation of a vault toilet, a water trough, and hitching posts for horses, and planting native shade trees. This trailhead also allows hikers and bicyclists access to the Bidwell Canyon Trail.

### Visitor Center

The Lake Oroville Visitors Center, situated atop Kelly Ridge between Oroville Dam and the Bidwell Canyon area, features exhibits on the engineering and construction of the hydroelectric power facilities, including the Oroville Dam, and explains how the Oroville Facilities distribute water and electrical power to their destinations. There are also interpretive displays on the native culture and the natural resources of the area. A 47-ft viewing tower provides a panoramic view of the reservoir and its surroundings. Shaded picnic areas and a short interpretive trail are provided nearby.

### Diversion Pool

The Diversion Pool covers a 4.5-mile stretch of the Feather River from Oroville Dam to Thermalito Diversion Dam. The narrow pool covers 320 acres, winds between steep wooded hillsides, and provides opportunities for visitors to enjoy quiet, uncrowded conditions.

### Day Use and Angling

This area is primarily used by shoreline picnickers, anglers, and walkers seeking a quiet undeveloped setting. The only facility provided is a vault toilet; no other day use or camping facilities are provided. A former DWR storage yard (known as Thompson Flat) has been recently upgraded. DWR graded the parking lot, installed signage, graveled the drive from Cherokee Road, and developed a spur trail from the staging area to an existing bicycle trail.

### Boating

Only non-motorized and electric motor boats are allowed on the Diversion Pool. There is an undeveloped boat access point at the Diversion Pool DUA for hand launching of boats.

### Trails and Trailheads

At the end of the Diversion Pool DUA access road (locally known as Burma Road) is a trailhead where hikers and bike riders can access the 41-mile Brad Freeman Trail, which follows Burma Road and the north shoreline of the Diversion Pool before climbing to Oroville Dam. A multiple-use segment of the Brad Freeman Trail also follows the opposite shore, running on a former railroad bed. The two sides are linked by the segment of trail that crosses Oroville Dam. (The majority of this trail makes a large loop

around Thermalito Forebay and Thermalito Afterbay, through the OWA, and along the Feather River LFC, as described below.)

The 14-mile Dan Beebe Trail is an equestrian trail (hikers are also permitted), winding through the hillsides above the south side of the Diversion Pool, that links to Kelly Ridge and continues to the Saddle Dam trailhead. The Lakeland Boulevard Trailhead sits above Thermalito Diversion Dam on the east side of the lower Diversion Pool and provides access to both trails. The large parking area serves as a day-use equestrian staging area with portable toilets and picnic tables. The Powerhouse Road Trailhead is near the upstream end of the Diversion Pool and provides access to the Brad Freeman Trail, but has no facilities.

### **Thermalito Forebay**

Thermalito Forebay is a 630-acre hourglass-shaped reservoir that is divided into north and south portions at a point where the pool narrows at the Nelson Avenue bridge crossing.

### **Day Use**

The 300-acre North Forebay DUA, the most popular day use site in the project area, features a large sandy beach and swim area on a shallow lagoon connected to the main body of the forebay. A large picnic area adjacent to the beach provides more than 100 picnic tables, many under shade structures, dispersed across a tree-shaded lawn. The picnic area is suitable for family or large group picnics, and has both flush toilet restrooms and vault toilets. A few picnic sites are also provided on the opposite side of the lagoon. The South Forebay DUA provides several shaded picnic sites and a sandy area for swimming. A vault restroom was recently added to the site. RV en-route camping is available at the North Forebay (RVs may park for the night).

### **Boating**

Only non-motorized boats are permitted on the North Forebay, which is popular with users of small sailboats and paddle craft. The North Forebay DUA provides two boat ramps with floating docks and an Aquatic Center. The Aquatic Center is a 1,200-square-foot (sq ft) boat storage facility used by California State University, Chico, and others for boating instruction and events. The South Forebay is open for motorized boating, and the South Forebay DUA at the opposite end of the pool includes a boat ramp with floating dock.

### **Angling**

The Thermalito Forebay is stocked regularly with trout and both the South and North Forebay DUAs are popular with local shore anglers. The South Forebay provides a fish cleaning station. Some boat angling also occurs on both portions of the Thermalito Forebay.

### Trails and Trailheads

A paved trail encircles the swim lagoon at the North Forebay DUA. The Brad Freeman Trail also passes through the site and runs near the north shore of the North Forebay, crosses the pool at Nelson Avenue, and runs atop the earthfill dam along the east side of the South Forebay.

### Thermalito Afterbay

Thermalito Afterbay is a shallow reservoir at the southwest corner of the project area covering 4,300 acres at maximum operating storage. Unlike Lake Oroville, the elevation of Thermalito Afterbay fluctuates during much of the year on a weekly cycle, with 4–6 ft of elevation change during a typical week. The typical daily elevation change is 1–2 ft. The pool is raised during the week and drawn down over the weekend, as dictated by hydroelectric power operations. Water temperatures can vary widely around Thermalito Afterbay in the summer, with water in the low 60s (°F) near the tailrace channel, in the mid-70s in the warmest, deeper water areas near the Thermalito Afterbay Outlet, and in the mid-80s in shallow backwater areas (DWR 2001a).

### Boating

There are three boat launch facilities on the eastern shore of Thermalito Afterbay used by pleasure boaters, anglers, and hunters. The Wilbur Road BR near the north end of the pool provides two launch lanes, a floating dock, a recently installed vault toilet, and a paved parking area. The Monument Hill BR/DUA also provides two launch lanes and a floating dock. This area is popular with personal watercraft (PWC) riders, as well as water-skiers who frequently use the nearby water-ski slalom course. The Larkin Road Car-top BR is on the southern portion of Thermalito Afterbay and provides a vault toilet and a low-gradient paved ramp (old road bed) used to launch PWC and other small boats. Windsurfers commonly launch from several informal shoreline access points near the SR 162 bridge.

### Day Use

The day use facilities on Thermalito Afterbay are at Monument Hill and include a small sand beach with picnic tables, additional shaded picnic sites on the hill above, and flush toilets. Informal swimming also occurs at Larkin Road Car-top BR.

### Angling

The diverse temperature structure of Thermalito Afterbay provides suitable habitat for both coldwater and warmwater fish, including a popular largemouth bass fishery. Fishing in Thermalito Afterbay occurs both from the shore and from boats. A fish cleaning station is provided at Monument Hill DUA.

### Trails and Trailheads

The Brad Freeman Trail runs around the north, west, and south sides of Thermalito Afterbay. Three trailheads are located in the area: one on the south side (East Hamilton Road) and two on the north side (Toland Road and Tres Vias Road). There are no facilities at any of these trailheads, which are primarily used by hunters.

### Other Facilities and Opportunities

Additional facilities at Thermalito Afterbay include hunting blinds that have been installed at various points along the shoreline for the use of waterfowl hunters. A special youth pheasant hunt is held in the area each fall. A model aircraft flying facility is used by a local club near the north shoreline and has benefited from recent improvements. DWR paved the crossing runways, graded and graveled the parking lot, installed aircraft staging tables, constructed picnic facilities with shade ramadas, and added fencing.

### Oroville Wildlife Area and Feather River

The OWA, not including the Thermalito Afterbay subunit described above, consists of about 5,700 acres of lands on both sides of the Feather River, most of which is within the FERC Project boundary. A large percentage of the OWA is covered with gravel and cobble spoil piles left behind by historic gold dredging in the river. There are numerous small willow and cottonwood-lined ponds in areas where this material has been removed. The OWA is adjacent to or straddles about 10 miles of the Feather River. The lower 1.25 miles of the LFC and the upper 1.5 miles of the LFC, upstream of the OWA, are within the FERC Project boundary.

### Day Use

There is a vault toilet at the Thermalito Afterbay Outlet area. There also are designated primitive camping areas at the Thermalito Afterbay Outlet, but no developed camping facilities.

The Feather River Fish Hatchery is located at the upper end of the LFC of the Feather River, immediately below the Fish Barrier Dam and about one-half mile below the Thermalito Diversion Dam. The hatchery provides interpretive displays related to salmon and trout, and seasonally provides a unique opportunity for visitors to watch fish ascend the fish ladder to the hatchery through underwater windows. Tours of the hatchery itself are also offered to the public. Additional amenities at the hatchery include an overlook platform at the base of the Fish Barrier Dam, riverbank benches, and restrooms. Recent improvements include new shade trees and assorted native plants and grasses on the Feather River Fish Hatchery grounds.

Day use of the east side of the Fish Barrier Pool has recently been improved to include a pedestrian trail (Sewim Bo Trail), picnic tables, shade ramadas, native trees and



shrubs, restrooms, interpretive signs, and parking, including Americans with Disabilities Act (ADA) access.

### Boating

A few motorized and non-motorized boaters use the 9-mile LFC, the upper 1.5 mile and lower mile of which are within the FERC Project boundary. Few developed boat access facilities are provided, particularly at the upstream end where non-motorized boaters would most desire to launch. Non-motorized boats are occasionally hand launched from the riverbank near the Feather River Fish Hatchery.

The only formal boating facility on the Feather River in the OWA is a gravel boat ramp at the Thermalito Afterbay Outlet. There are several other unpaved and informal boat launch sites along the west bank of the river. Some motorized boating activity (primarily by anglers) on the river in the OWA originates from a private campground boat ramp across the river from the OWA (outside the FERC Project boundary) and from access point downstream of the project area.

### Angling

The Feather River draws most visitors to the OWA, in particular its steelhead and salmon fishery. The most visited site in the area is the well-known Thermalito Afterbay Outlet area, where Thermalito Afterbay releases water into the Feather River. During the peak of the steelhead and salmon seasons, the site is heavily used by both boat and bank anglers from throughout the region. Anglers also gain access to the riverbank and several riffles at several dispersed locations where levee roads provide close vehicle access. Fishing for warmwater species also occurs at some of the OWA ponds.

### Trails and Trailheads

The Brad Freeman Trail runs through the northern portion of the OWA following the gravel levee-top road network and former railroad beds. Informal walking paths exist where visitors may access the Feather River from roadside parking areas. Paved (street) segments of the Brad Freeman Trail run near the east riverbank of the LFC from the OWA to the Diversion Dam, linking Riverbend Park and the Feather River Nature Center.

### Hunting

The ponds in the OWA draw waterfowl hunters during the fall and winter hunting seasons. Dove and quail hunting also occurs during the fall, and a special lottery turkey hunt is held each spring. Deer hunting is permitted, but is limited to bows, shotguns, and handguns (no rifles allowed). Seasons and hunting opportunities are established by the California Fish and Game Commission and are subject to change.

#### **4.7.2.3 Americans with Disabilities Act Accessibility at Project Area Facilities**

Facilities required to be ADA accessible within the study area meet, or will soon be upgraded to meet, ADA technical standards. These include facilities such as parking spaces, restrooms, pathways between parking and restrooms, and campsites. Not all recreation facilities are required to be made accessible. Additionally, the managing agencies have met the required ADA standards by providing disabled recreationists access to the "programs" available in the area. Programmatic access is required by the *Americans with Disabilities Act Access Guidelines*. All indoor facilities are required to be made accessible while outdoor facilities are required to be made accessible by "program." The programs that are accessible include campgrounds, boating facilities, picnic areas, and beach/water access.

The ADA Accessibility Study (SP-R6) identified a few opportunities to go beyond programmatic compliance in addressing access deficiencies. For example, most of the paved walkways between the parking area and the picnic sites at the Loafer Creek DUA are too steep for disabled visitors to use. Also, the Recreation Needs Analysis (SP-R17) identified opportunities to expand special facilities such as ADA fishing piers (only one exists within the FERC Project boundary, at the North Forebay DUA).

#### **4.7.3 Specially Designated Areas in the Project Area Vicinity**

Though all located outside of the FERC Project boundary, there are several federally designated areas in the vicinity of Lake Oroville including one Scenic Area, one National Recreation Trail and one National Scenic Trail, a Scenic Byway, and a Wild and Scenic River. A description of each is given below.

##### **4.7.3.1 Feather Falls Scenic Area and National Recreation Trail**

The Feather Falls Scenic Area is a 15,000-acre area managed by Plumas National Forest. The scenic area is southwest of Bucks Lake and northeast of Lake Oroville, near the town of Feather Falls. The Feather Falls National Recreation Trail is a 9-mile loop trail that leads to Feather Falls. The trailhead is approximately 20 miles east of the city of Oroville. Feather Falls, at 640 ft, is the sixth highest waterfall in the contiguous United States and the fourth highest in California. The trail also provides excellent views across the canyon of the Middle Fork Feather River to Bald Rock Dome, a large barren granite dome that rises above the canyon and dominates the scenery for miles around.

##### **4.7.3.2 Feather River National Scenic Byway**

The byway, dedicated by USFS in 1998, follows SR 70 from the north end of Lake Oroville up through the gorge of the North Fork of the Feather River. Travelers enjoy spectacular views and many points of cultural, geologic, and historical interest along the 130-mile route.

#### **4.7.3.3 Middle Fork Feather Wild and Scenic River**

The Middle Fork Feather River (MFFR) was designated a National Wild and Scenic River (WSR) in 1968. The MFFR WSR is currently administered by Plumas National Forest and runs from near Beckwourth to Lake Oroville. It is located outside of the FERC Project boundary. The designated reach totals 77.6 miles, including 32.9 miles of Wild River area, 9.7 miles of Scenic River area, and 35 miles of Recreational River area designation. The lower part of the MFFR flows through a deep canyon with numerous large boulders, narrow steep canyon walls, and some impassable waterfalls. Rafting and kayaking opportunities are considered to be for experts only (Class V). The upper stretches of the river, however, are gentler with easy access, proving opportunities for rafting and canoeing.

#### **4.7.3.4 Pacific Crest Trail**

The Pacific Crest Trail (PCT) is 1 of 8 National Scenic Trails in the United States, this one spanning some 2,650 miles from Mexico to Canada through 3 western states. The route was first explored in the late 1930s by teams of young men from the YMCA. Once proven feasible, trail pioneers Clinton Clarke and Warren Rogers lobbied the federal government to secure a border-to-border trail corridor. Largely through the efforts of hikers and equestrians, the PCT was eventually designated one of the first scenic trails in the National Trails System by Congress in 1968 and was dedicated in 1993. The PCT generally runs in a north-south direction, east of the project area. The PCT crosses the Middle Fork Feather River and SR 70 near the town of Belden, approximately 40 miles northeast of the project area.

#### **4.7.4 Recreational Opportunities/Facilities Outside the Project Area**

A few sites offer recreational opportunities and facilities in the immediate vicinity of the project area. Although adjacent to the OWA, two facilities located in the Clay Pit (a borrow area used in the construction of Oroville Dam) are outside of the FERC Project boundary. Also in the vicinity of the project area but outside the FERC Project boundary are Riverbend Park and Bedrock Park.

The Clay Pit State Vehicular Recreation Area (SVRA), located 3 miles southwest of the city of Oroville, provides a riding area for off-highway vehicle (OHV) enthusiasts and is managed by DPR. The clay used to build Oroville Dam was taken from this area, resulting in a large shallow pit ringed with low hills, providing about 220 acres of riding area. The site has a gravel staging/parking area for loading and unloading vehicles. The site is accessed from Larkin Road.

The Rabe Road Shooting Range, managed by DFG, is an unstaffed public shooting area with unmarked backstops (undefined places to place paper targets), a graded and graveled parking area, seven picnic tables, and a vault toilet building. It is technically a rifle range, but pistol use commonly occurs there as well. The shooting range is directly adjacent to Clay Pit SVRA.

Riverbend Park and the adjacent Bedrock Park are located on the LFC of the Feather River on the west side of the City of Oroville, and are owned and managed by Feather River Recreation and Park District (FRRPD). Riverbend Park provides riverbank access and day use amenities such as a Frisbee golf course, a paved loop trail with exercise stations, benches, and picnic tables. Recent upgrades to the park include enlargement of the boat launch and construction of restrooms, play areas, parking, and picnic shelters. The adjacent Feather River Fish Ponds (recently improved and operated by FRRPD in a lease partnership with DFG as part of the West Park Riverbend Corridor) include parking and restrooms. At this location, visitors can fish from the pond banks and off of piers. The piers and restrooms are ADA accessible. Bedrock Park is a smaller facility that provides access to the river for anglers and swimmers, shaded picnic sites and an irrigated lawn area, and restrooms. Bedrock Park is separated from Riverbend Park by SR 70, but the two parks are connected by a paved bike and walking trail.

Plumas National Forest lands also offer access to a range of activity opportunities including camping, boating, hiking, and OHV use. One of the closest opportunities to the Oroville Facilities is the Feather Falls National Recreation Trail, described above. Boaters can also hike to the base of the falls from the upper reaches of the Middle Fork arm of Lake Oroville when the reservoir water level is high.

#### **4.7.5 Recreational Use, User Characteristics, and Capacity**

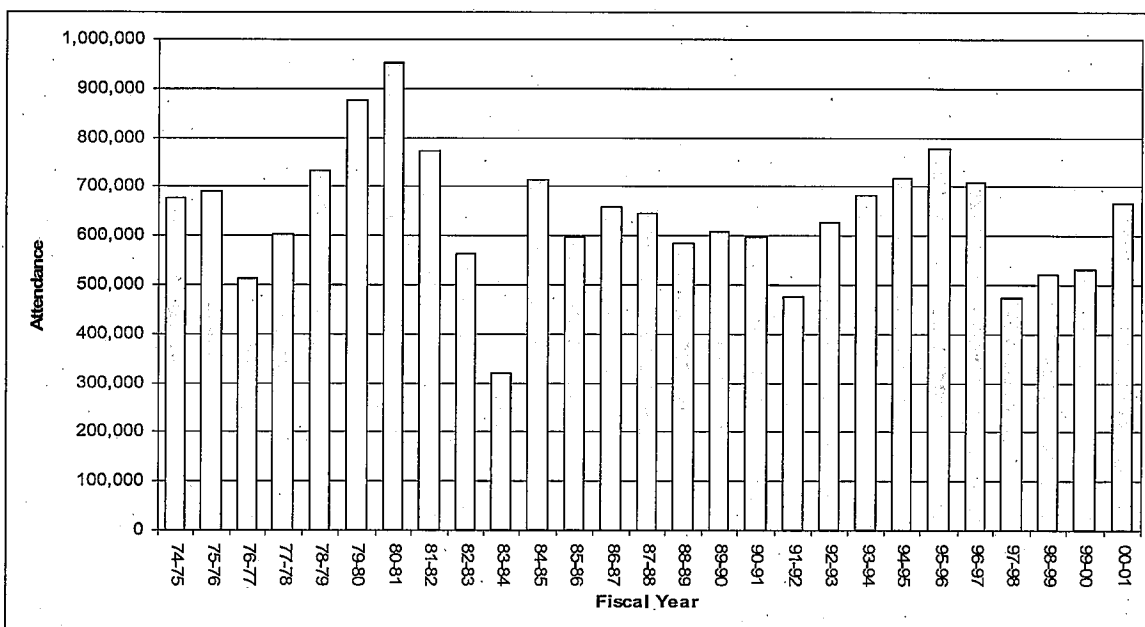
This subsection describes historic and current recreation use levels by activity and for various geographical areas within the FERC Project boundary. Recreation use levels are measured in recreation days (RDs). A single RD represents participation in recreation at a site during a single calendar day by one person for any length of time. This is followed by a discussion of issues related to the capacity of recreation areas and facilities to support current use.

##### ***4.7.5.1 Historic Use Levels***

Official DPR estimates of attendance for LOSRA are available on a fiscal year (FY) basis (July through June) for the period 1974-75 to 2000-01. Figure 4.7-2 illustrates these data. The estimates represent a compilation of daily use data at various park units into monthly and FY totals, and so are comparable to RD estimates of current use. LOSRA comprises the majority of the project area, and includes all Lake Oroville, Diversion Pool, and Thermalito Forebay recreation sites and surrounding lands and waters. The data also include attendance at the Clay Pit SVRA since FY 1996-97. Historic attendance data are not available for Thermalito Afterbay and the OWA because these data were not regularly collected by the two managing agencies, DWR and DFG, until about 1995.

The annual average total attendance across the 27 years for which data are available was about 650,000 visits. Although considerable variation is seen in the data, for most years attendance was between 500,000 and 700,000 visits. Attendance peaked during FY 1980-81 at over 950,000 visits and was over 700,000 visits for several years around

that time. The lowest attendance was recorded for FY 1983-84 with just over 320,000 visits. However, investigation of the very low attendance estimate for FY 1983-84 for the purpose of relicensing studies yielded the conclusion that the estimate may not be accurate and is most likely a result of counting problems. The next lowest attendance estimate was about 472,000 visits for FY 1997-98, and attendance was only slightly higher for FY 1991-92 with about 477,000 visits. FY 1991-92 fell in the midst of a multi-year drought, which severely reduced the water levels in Lake Oroville. (Statistical modeling performed for the Projected Recreation Use Study [SP-R12] established that pool level in Lake Oroville was positively related to attendance at Lake Oroville recreation sites.) Attendance appears to be on an upward trend since the low in FY 1997-98.



Source: DWR 2003

**Figure 4.7-2. Recreation visitor attendance at LOSRA recreation sites, fiscal years 1974-75 to 2000-01.**

#### 4.7.5.2 2002–2003 Estimated Annual Use

The Existing Recreation Use Study (SP-R9) estimated use within the project area by site and divided use at each site by activity. The following describes the total amount of use by each activity at each major geographic area within the project area according to the popularity of each activity. Estimates of use by activity were made based mainly on observational data; professional judgment and informal observations were used where necessary. Estimates of use are for the period from May 15, 2002, to May 14, 2003. Activities included in estimates were bank fishing, boating access, camping, sightseeing, hunting, picnicking, swimming, and trail use. The term “boating access” is used because boating activities do not literally occur at the site; the site provides access for boaters to the body of water where boating activities actually take place.

Sightseeing includes activities such as driving for pleasure, touring sites, or looking around. Picnicking also includes the activities of resting and relaxing.

### **Boating**

Boating (reported as boating access in the Existing Recreation Use Study [SP-R9] because boating does not actually occur at sites) was the most popular activity in the project area. At Lake Oroville, 45 percent or about 411,011 RDs were accounted for by boating. Boating was also popular at Thermalito Afterbay, where 52,557 RDs or about 56 percent of use at Thermalito Afterbay was boating access. Boating was not as popular at Thermalito Forebay (10 percent of use/14,234 RDs), the river or ponds within the OWA (8 percent of use/25,021 RDs), or the Diversion Pool (4 percent of use/729 RDs) as it was at Lake Oroville or Thermalito Afterbay.

### **Angling**

Angling by boat was included in the estimate for boating; however, the amount of bank angling was estimated separately. Bank fishing was the third most popular activity overall within the project area. Bank angling was extremely popular in the OWA compared to the rest of the geographic areas within the FERC Project boundary. About 67 percent of the use within the OWA was estimated to be bank angling, equivalent to 213,709 RDs. Almost one-quarter (24 percent) of use at Thermalito Forebay was estimated to be bank angling, about 32,110 RDs. About one-fifth of the use at Diversion Pool was estimated to be from bank angling with 4,371 RDs. Bank angling accounted for less than 10 percent of total use at Lake Oroville (5 percent/48,145 RDs) and at Thermalito Afterbay (4 percent/3,992 RDs).

### **Trail Use**

Use of specific trail segments by number of people (using infrared trail counters) and trail use at trailheads were estimated, with results presented in the Existing Recreation Use Study (SP-R9). Generally, trail use is relatively low; it may even have been elevated during the study period because trails were designated multi-use and thus opened to more user groups. Trail use data show that the highest trail use occurred in October, with about 50–60 people using specific trails within the FERC Project boundary on peak days. This is an average of five people per hour, a relatively low level of use. The lowest trail use occurred from mid-December through mid-March, with no use recorded on many days and peak daily use of ten or fewer people on representative trail segments. As for use at trailhead sites, this accounted for only 1 percent of total use at Lake Oroville (4,690 RDs) and Thermalito Afterbay (891 RDs). However, at the Diversion Pool, one-half of use was estimated to be from trail use (10,403 RDs). Trail use accounted for about 1 percent of total RDs within the project area.

### **General Day Use**

Three general day use activities were estimated in the Existing Recreation Use Study (SP-R9): picnicking, sightseeing, and swimming. Sightseeing was the second most popular activity within the project area, picnicking was fourth, and swimming was fifth. Combined, these activities were most popular at the Feather River Fish Hatchery where 100 percent of use was accounted for by general day use activities (160,395 RDs). General day use activities were also very popular at Thermalito Forebay, where 62 percent of total use or 85,034 RDs were accounted for these activities, owing in part to the very popular swimming lagoon at North Forebay BR/DUA. This lagoon is one of the only two formal swimming areas within the FERC Project boundary. Over one-third of use at Lake Oroville (36 percent/328,109 RDs) and Thermalito Afterbay (38 percent/35,928 RDs) was accounted for by picnicking, sightseeing, and swimming. One-quarter of total use at the Diversion Pool was accounted for by these 3 activities, or 5,100 RDs. At the OWA, 22 percent of total use was estimated to be from these general day use activities, equivalent to 70,866 RDs.

### **Camping and Other Overnight Use**

Camping primarily occurs at Lake Oroville, where all of the developed campgrounds are located. About 7 percent of the total use at Lake Oroville was estimated to be from camping, about 62,300 RDs. There was also low use of the RV en-route camping at North Forebay BR/DUA (39 RDs) and Spillway BR/DUA (91 RDs, included in the Lake Oroville total). Overall, camping was the sixth most popular activity in the project area, with about 4 percent of total use.

### **Other Recreational Uses**

There are four other main activities for which use estimates were generated: hunting, walking, target shooting, and OHV use. It should be noted that OHV use is prohibited by law on all lands within the FERC Project boundary.

Most of the hunting in the project area occurs in two geographic areas: the greater OWA and the Thermalito Afterbay portion of the OWA. Hunting access occurs at these areas at three main locations: the West and East Levee Roads in the south portion of the OWA, and trailheads near Thermalito Afterbay including South Wilbur Road Trailhead, Toland Road Trailhead, and Tres Vias Road Trailhead. Hunting accounted for 27 percent of total use at these trailheads, or 4,995 RDs. Within the OWA, hunting only accounted for 3 percent of total use or 8,866 RDs. (The percentage of total use is low in part because hunting is seasonal with most hunting occurring between October and January.) Hunting is also allowed in the more remote parts of LOSRA away from developed recreation areas, but the level of activity is believed to be low as virtually no such use was discerned during recreation surveys.

Walking use tends to be mostly at the Oroville Dam/Overlook DUA and the North Forebay BR/DUA. Due to its proximity to the Kelly Ridge residential area, its views of the reservoir and Sacramento Valley, and the mile-long crest with pedestrian walkway,

Oroville Dam is a popular place to walk, jog, or bicycle. There were an estimated 56,930 RDs associated with walking, jogging, and bicycling across the dam. At the North Forebay BR/DUA, walking generally occurs on the path around the swimming cove. North Forebay is located fairly close to residential areas and therefore receives many local visitors who enjoy walking there. There were an estimated 4,303 RDs from walkers at the North Forebay BR/DUA.

#### **4.7.5.3 Project Area Visitor and Visit Characteristics**

The following summary serves to describe in general terms the visitors to the project area and their use of the area for recreation based on survey results.

Most project area visitors are regular visitors to the area (three or more visits per year) and most visit during the spring and fall as well as summer. Over 60 percent of visitors surveyed were from Butte County or an adjacent county, and nearly all of the remaining visitors were from elsewhere in northern California.

Visitors to Lake Oroville, where most project area camping facilities are located, were fairly evenly divided between day and overnight users. In contrast, 60–90 percent of visitors to other parts of the project area were day users. Most overnight visitors stayed 2 or 3 days, and most stayed in campgrounds or with family/friends. Nearly 90 percent of visitors from Butte County and the adjacent counties were day users, while most visitors from more distant locations were overnight visitors. Day user visits averaged 4–6 hours in length. About one-quarter of visitors surveyed at Lake Oroville also planned to visit other portions of the project area, and about 30–45 percent of visitors to most downstream areas planned to visit Lake Oroville sites.

Group sizes at most areas average two to four people. Large groups were more common at Thermalito Forebay, where the median group size was seven people. Proximity to their homes and desirable natural resource features such as high water quality were the predominant reasons for visitors to come to most of the project area. Fishing opportunities was the predominant reason among OWA visitors. Project area visitors participated in a wide range of activities, but water-based recreation such as motorboating, water-skiing, swimming, and angling were the predominant activities in most areas. Other important activities, in particular at the Diversion Pool and the Feather River, were trail walking/hiking, biking, and horseback riding. Sightseeing, picnicking, and general relaxing are also important at many areas.

#### **4.7.5.4 Existing Recreation Capacity**

The existing capacity status and identified capacity issues of resource areas and facilities for boating, camping, day use, angling, and trail use are summarized here.

##### **Boating**

The Reservoir Boating Study (SP-R7) indicated that boat traffic is moderately dense on Lake Oroville during peak-season holidays, and many additional boats spend time



moored on or near shore, where there may be competition for mooring sites. The study also established that the typical length of time boaters wait to use the ramps is not excessive, although waits of 20–30 minutes may occasionally occur at peak-use times. Observation of peak holiday weekend launching at the Spillway boat ramp, the largest such facility on the reservoir, indicated that back-ups at the ramp were minimal and waits were short. Corresponding with these conditions, boaters' perceptions of crowding and conflict problems on the project reservoirs are low, and these problems appear to be short-term and localized where they do occur, typically only during holiday peak use conditions.

Facility capacity limits affect recreation access at Bidwell Canyon, where boaters frequently cannot gain access to the boat ramp during high-water summer weekends and holidays due to lack of parking. This is in part due to Bidwell Canyon Marina boaters parking their vehicles in vehicle/boat trailer spaces in the boat ramp parking lot, which is exacerbated by insufficient marina parking. This problem is particularly acute when reservoir pool levels are high; additional marina parking becomes available in the fluctuation zone as the pool level falls. The boat ramp and marina parking is commonly full to capacity by mid-morning on some weekends, causing arriving visitors to be turned away. Boaters wishing to launch a boat can instead drive 3 miles to the Spillway boat ramp, where ample parking is available. Marina boaters may park in the adjacent residential area and walk to the marina.

Parking capacity for boaters wanting to launch their boats at Lime Saddle is also an issue during some peak-use periods. The parking areas are shared by boat ramp users and marina boaters. As observed at Bidwell Canyon, vehicle/trailer spaces are often used by marina boaters due to an insufficient number of spaces for single vehicles. Additional parking is available at a gravel overflow lot outside the park entrance.

### **Camping**

Average occupancy of campgrounds during summer recreation season weekends, the peak-use period, was generally not high during the relicensing study period, averaging about 50–60 percent at most sites. An exception was the Loafer Creek Group Campground, with an average occupancy rate of over 80 percent, and near 100 percent occupancy during July and August. The floating campsites also had high occupancy rates, ranging between 84 and 94 percent on both weekdays and weekends through the summer months. The Lime Saddle Group Campground and Loafer Creek Equestrian Campground had low occupancy rates during the summer recreation season, below 35 percent. Equestrian campground occupancy was higher during the spring and fall, when trail riding conditions were more favorable. Occupancy of all campgrounds may be higher during years with more consistent high reservoir pool levels than existed during the relicensing study period.

### **Day Use**

Use of the developed day use facilities in the project area was generally moderate, and crowding problems were not found. However, use of the largest DUA on Lake Oroville,

the Loafer Creek DUA, was greatly reduced during the study period by low reservoir water levels. Use of the North Forebay DUA, the largest such facility in the project area, exceeded parking capacity only occasionally during peak holiday periods.

### **Angling**

Boating activity on the project area reservoir is generally low during the off-season, which is the period when most angling occurs. Anglers on the project area reservoirs had few complaints about crowding; however, bank and boat anglers in the OWA and on the Feather River LFC expressed concern about crowding. The high concentration of both boat and bank anglers at the Thermalito Afterbay Outlet can sometimes cause conflicts between anglers (in particular between bank and boat anglers). The majority of anglers contacted in the OWA (including at the Thermalito Afterbay Outlet) considered the areas where they fished to be moderately to extremely crowded.

### **Trail Use**

Use of most trails appears to be low or moderate, with the highest use occurring during the spring and fall. A high percentage of trail users (generally over 90 percent) expressed satisfaction with the condition of the trails (poor trail conditions are one indicator of overuse), and perceptions of crowding were very low.

#### ***4.7.5.5 Visitors' Experience, Perceptions, and Preferences***

This subsection summarizes information obtained primarily by recreation visitor surveys conducted throughout the project area that outlines overall satisfaction, perceptions of key issues, and perceptions related to recreation facilities and management. Additional information was obtained through on-site observations. The summary is organized by management area and primary recreation activities in those areas.

### **Lake Oroville State Recreation Area**

LOSRA visitors indicated they were satisfied with their overall recreation experience and relatively few felt crowded. From 70 percent to over 93 percent of visitors to these areas indicated they were satisfied, very satisfied, or extremely satisfied with their trip to the area. Regarding crowding at recreation sites, about 67 percent of Thermalito Forebay visitors, 70 percent of Lake Oroville visitors, and over 90 percent of Diversion Pool visitors rated their perception of crowding between "not at all crowded" to "slightly crowded."

Additional information is reported below that describes specific activity groups' level of satisfaction, and existing issues and problems identified at LOSRA through the completion of recreation technical studies.

### **Boating**

In general, the Recreation Surveys (SP-R13) indicated that boaters enjoy a high level of satisfaction with their boating experiences, with about 74 percent stating they were

satisfied to extremely satisfied. Large majorities felt that the number of boat ramps, marinas, boat-in gas stations, and boat-in campsites were adequate. Relatively few boaters felt that the number of watercraft on the water or interactions/conflicts between boaters were more than a slight problem and large majorities felt that most of these issues were not a problem at all. Boaters' greatest concerns related to exposed land and shallow areas during low water levels, which are unavoidable effects of reservoir drawdown and which are most prevalent during the late summer and during drought periods.

Boaters' use of several of the boat ramps may be hampered by the lack of boarding docks for some of the launch lanes, and a majority of boaters felt that the number of docks or temporary moorage sites was too few. Also, excessive floating debris, mud and debris on the boat ramps, and partially grounded floating docks during low-water periods were observed at some locations. Some boaters expressed concern about the amount of floating woody debris that remains on the surface of Lake Oroville during the spring and early summer, in spite of DWR's and DPR's collection efforts.

#### Camping

Overall, LOSRA campers expressed high satisfaction with their experience at the campgrounds and 74 percent of campers said they were satisfied, very satisfied, or extremely satisfied with their trip. Large majorities of Lake Oroville visitors felt that the number of campgrounds, campsites with RV hookups, group campsites, and number of shower facilities were adequate. Nearly half of those visitors felt that the number of floating campsites was too few. The floating campsites are a unique and popular type of facility, but the limited number of suitable sites and high maintenance requirements are likely to limit further expansion.

A few campers at each campground made requests for a range of additional amenities, such as play areas for children, more convenient trail access to the shoreline, and more availability of food and convenience items.

#### Angling

About 76 percent of Lake Oroville anglers, 80 percent of Thermalito Forebay anglers, and 91 percent of Diversion Pool anglers stated that they were satisfied with their angling experience. Those who were not satisfied most often said their failure to catch fish was the reason, but most anglers reported catching fish and catch rates appear to be good. Anglers' perception of crowding in the areas where they fished was generally low with 74 percent at Thermalito Forebay, 76 percent at Lake Oroville, and 100 percent at Diversion Pool considering these areas to be not at all crowded to slightly crowded. With the exception of the Diversion Pool, large majorities of LOSRA visitors felt that the number of fish cleaning stations was adequate.

#### Trail Use

About 83 percent of visitors whose primary activity was trail use indicated that they were satisfied, very satisfied, or extremely satisfied with their trip. Also, a high percentage of

trail users (generally over 90 percent in each management area) expressed satisfaction with the condition of the trails. Large majorities of Lake Oroville, Diversion Pool, and Thermalito Forebay visitors considered the number of paved and unpaved bike trails, hiking trails, and equestrian trails to be adequate, while less than a majority, about 43 percent, of Diversion Pool trail users felt that the number of equestrian trails was too few. A similar percentage of Lake Oroville and Diversion Pool trail users felt that the number of signs indicating trail locations was too few.

In general, few LOSRA trail users (6–9 percent) reported encounters with other trail users that they felt put them at risk. The most common types of such encounters were reported by equestrians in reference to bike riders; other encounters involved walkers with dogs and illegal motorized trail use. A few equestrian trail users surveyed expressed dissatisfaction with multiple-use trails (shared with bikes) and expressed a desire for separate trails.

### Swimming and Other Day Use

The primary issues surrounding swimming opportunities and other day use activities are related to project operations and are discussed below in Section 4.7.5.6, Existing Effects of Project Operations on Recreation Resources. Related to this is the finding that from one-half to two-thirds of Lake Oroville and Diversion Pool visitors felt that the number of swim areas and developed day use or picnic areas along shore was too few and about one-third of Lake Oroville visitors considered access to the shoreline to be a moderate or big problem. Reservoir drawdown is the primary constraint on these types of shoreline developments at Lake Oroville.

In regard to other types of day use facilities, large majorities of LOSRA visitors felt that the number of group picnic sites, equestrian facilities, and restrooms was adequate.

An additional issue related to swimming involved water quality at the popular swim beach at the North Forebay DUA. Water quality testing done for environmental technical studies indicated that bacteria levels were consistently high in the area during the summer, possibly due to the high number of geese present in the area.

### Oroville Wildlife Area

In keeping with prior data analysis and technical study plan reports, data from the greater OWA and Thermalito Afterbay visitors are reported separately, although Thermalito Afterbay is managed as a part of the OWA.

Most OWA visitors indicated that they were satisfied with their overall recreation experience. About 64 percent of OWA visitors and 69 percent of afterbay visitors indicated that they were satisfied, very satisfied, or extremely satisfied with their trip to the area. Regarding crowding at recreation sites, about 67 percent of Thermalito Afterbay visitors rated their perception of crowding between not at all crowded and slightly crowded. However, perceptions of crowding at the OWA were higher, with about 50 percent rating crowding between moderately crowded and extremely crowded.

These responses are strongly associated with the Thermalito Afterbay Outlet site, described previously as one of the most popular salmon and trout angling locations in the region, particularly during the fall spawning run.

Additional information is reported below that describes specific activity groups' level of satisfaction, and existing issues and problems identified at the OWA through the completion of recreation technical studies that may reduce enjoyment and satisfaction for some visitors.

### Areawide Issues

Three issues appear to be affecting recreation satisfaction and enjoyment in many areas of the OWA. First among these is safety and security. Although the majority of OWA visitors surveyed felt that overall safety and security as well as law enforcement presence was not a problem in that area, higher percentages (20 and 30 percent, respectively) than in any other area felt that these were moderate or big problems. Second is litter accumulation, which was noted at camping areas and DUAs as well as along parts of the riverbank and dispersed access areas used by anglers. Three-quarters of OWA visitors considered litter along the shoreline to be a moderate or big problem, and 58 percent held this perception of sanitation along the shoreline. Third, parts of the gravel levee-top roads that provide access to most of the OWA are rough and washboard with frequent potholes.

### Camping

Large majorities of OWA and smaller majorities of Thermalito Afterbay visitors felt that the number of campgrounds, campsites with RV hookups, group campsites, and shower facilities was too few. However, as described above, the level of recreation development represented by developed campgrounds generally conflicts with the policies and goals of the DFG for management of State Wildlife Areas.

Some campers expressed dissatisfaction with the primitive camping facilities provided in the OWA. Litter, vegetation damage, and other ecological effects were noted in the primitive camping areas, as were camper concerns about personal safety and adequate law enforcement presence.

### Angling

About 82 percent of OWA anglers and 72 percent of Thermalito Afterbay anglers stated that they were satisfied with their angling experience. As at LOSRA, those who were not satisfied most often said their failure to catch fish was the reason, but most anglers reported catching fish and catch rates appear to be good. Crowding and undesirable site conditions such as litter, overflowing garbage cans, and dirty (or the lack of) restrooms were also given as reasons. Anglers' perception of crowding in the areas where they fished were generally low at Thermalito Afterbay, with about 63 percent of afterbay anglers considering the area to be not at all crowded to slightly crowded. In contrast, only 31 percent of OWA anglers considered the areas where they fished to be

not at all to slightly crowded, while about 54 percent considered it moderately to extremely crowded.

Most afterbay visitors considered the number of fish cleaning stations to be adequate (one is provided at Monument Hill DUA), but about 90 percent considered the number provided at the OWA (none are provided) to be too few. It should be noted that DFG recommends that fish be cleaned in the Feather River, as the entrails provide nutrients to the system that would normally be provided by natural salmon mortality.

Other issues about which OWA anglers expressed concern included rude behavior by other anglers, illegal fishing practices, and the amount of litter on the riverbanks. The high concentration of anglers at the Thermalito Afterbay Outlet can sometimes cause conflicts between anglers (in particular between bank and boat anglers), and many anglers felt that additional law enforcement was needed.

#### Hunting and Other Open Space Activities

Three out of four hunters interviewed within the OWA were satisfied with their hunting experience, and most who were hunting for ducks (the most commonly hunted game in the area) were successful, as were most turkey hunters and over 40 percent of pheasant hunters. However, dissatisfied hunters felt that the habitat in the area needed improvement and several hunters felt that habitat had declined in recent years. Exotic weeds invading many of the ponds used for waterfowl hunting was seen as a major problem.

Wildlife viewing and nature study opportunities are prevalent in the OWA, with a large variety of species of birds, mammals, reptiles, and amphibians. However, as described previously, the lack of facilities along with trash accumulation, dumping, and rough roads may discourage organized nature study field trips by school groups or by individuals. Over one-half of afterbay visitors and nearly three-quarters of OWA visitors considered the number of interpretive programs and educational opportunities to be too few.

#### Boating on Thermalito Afterbay

Use of powerboats and PWC at speeds greater than 5 miles per hour (mph) is technically not allowed by DFG within State Wildlife Areas, in accordance with boating speed restrictions specified in Title 14 of the California Fish and Game Code. However, these speed limits have historically not been enforced on Thermalito Afterbay. To the contrary, boating access improvements used by all types of power boaters including water-skiers and PWC riders have been constructed in recent years and a water-ski slalom course was installed. Essentially, boating speeds are not enforced on Thermalito Afterbay due to conflicting management goals; in this case, DWR's goal is to provide recreational boating opportunities and DFG's goal is to limit activities inconsistent with wildlife management, enhancement, and protection (pers. comm., Atkinson 2003).

### **Feather River**

In keeping with prior data analysis and technical study plan reports, discussion for the Feather River is for sites on the LFC portion of the river, upstream of the OWA. Other Feather River sites are included within the OWA, since all of the recreation access and sites are within the OWA. LFC survey sites included the Feather River Fish Hatchery (within the FERC Project boundary) and Riverbend Park (outside the FERC Project boundary).

Most Feather River visitors indicated that they were satisfied with their overall recreation experience. About 62 percent of visitors indicated that they were satisfied, very satisfied, or extremely satisfied with their trip to the area. About 77 percent of anglers said they were satisfied with their fishing experience. Regarding crowding at recreation sites, about 76 percent of visitors rated their perception of crowding "not at all crowded" and "slightly crowded."

Few issues and problems were identified at the Feather River Fish Hatchery or other Feather River areas through the completion of recreation technical studies. Large majorities considered most trail, camping, and boating facilities to be adequate in number. About 74 percent considered the number of fish cleaning stations to be too few (none are provided). Although not a majority, about 43 percent considered the number of restrooms to be too few. Few visitors considered any management issues, water condition issues, or user interaction issues to be a problem. The issue of litter along the shoreline may be considered an exception, with 41 percent considering this to be a moderate or big problem.

### **Projectwide**

A few issues pertinent to recreation across the project area were identified through the completion of the recreation technical studies and other aspect of the relicensing program.

First, the collaborative relicensing process has included a discussion of a need for a comprehensive trails plan to resolve issues around multiple use of trails and trail safety, as well as issues surrounding needs for trail expansion, trail maintenance, development of more loop trails, and potential for specially designed single-track mountain bike trails. The Recreation Needs Analysis (SP-R17) recommends that a Comprehensive Non-Motorized Trails Program be developed to address all trail and trailhead management issues.

Second, the Recreation Needs Analysis suggests that a comprehensive Interpretation and Education (I&E) Program should be developed to plan and coordinate I&E efforts among the several agencies that provide access and facilities in the area. In addition, it was noted that few interpretive facilities exist downstream of Lake Oroville, with the exception of fisheries-related displays at the Feather River Fish Hatchery and standard informational bulletin boards at some sites.

Third, several stakeholder groups believe that non-local visits to the area, an important factor in economic growth, could be increased by additional facilities to support special events. DPR and FRRPD are responsible for permitting or organizing several special events each year. Special events that are currently being offered in the Lake Oroville area on an annual basis or more frequently include but are not limited to major fishing tournaments, equestrian trail rides, a competitive mountain bike ride, a triathlon, an Independence Day celebration, a salmon festival, and Butte Sailing Club events. Each of these events occurs in total or in part within the project area. Specific interest has been identified in new or enhanced facilities to support these events or other events such as water-skiing competitions, power boat races, and PWC races, some of which have been held in the project area in past years.

#### **4.7.5.6 Existing Effects of Project Operations on Recreation Resources**

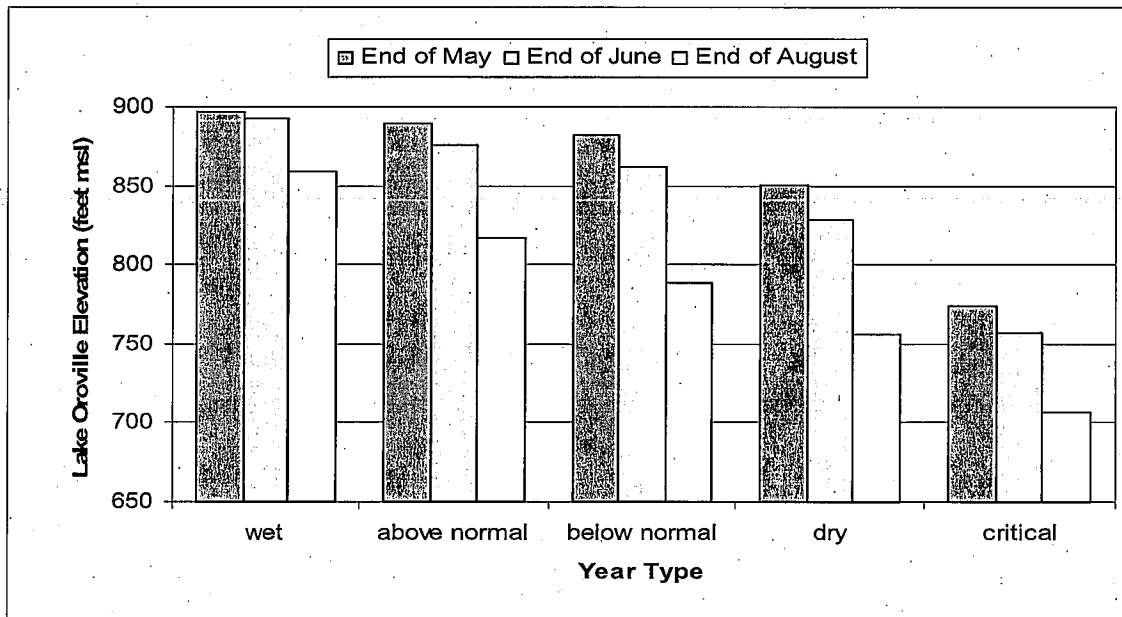
Several important effects of project operations on recreation resources, identified within the recreation studies and quantified using hydrologic modeling conducted by the licensee, would continue into the future. Prominent among these are effects of the drawdown of Lake Oroville during the normal annual cycle of reservoir operations. Other effects include weekly fluctuations in water level at Thermalito Afterbay, cold water temperatures through the peak summer boating and swimming period in areas downstream of Lake Oroville (Diversion Pool, Thermalito Forebay and Thermalito Afterbay, and Feather River), and regulated flows in the LFC of the Feather River.

#### **Lake Oroville Drawdown Effects**

The annual drawdown of Lake Oroville affects boating, shoreline access and use (including swimming), and indirectly affects angling and camping. Effects are slight but negative in most cases (and positive in some cases) at pool levels within about 50 ft of full pool (850–900 ft msl). Effects are moderately negative in most cases at pool levels between 800 and 849 ft, but are more severe at certain types of facilities. Below 800 ft, effects become more substantial at several facilities, and 1 major boat ramp closes at a pool elevation of 775 ft. Access to the reservoir for both boaters and shoreline users is available down to pool levels below 700 ft, but the quantity and quality of access is progressively reduced as the pool level declines.

Hydrologic modeling based on historic hydrologic conditions for a 73-year period (1922–1994) has produced simulations of Lake Oroville elevations at several key end-of-month dates during the peak summer use season, for different water-year types (wet, above normal, below normal, dry, and critical) under existing operating conditions and levels of demand for water (see Figure 4.7-3). These results can be used to evaluate likely reservoir conditions at specific times of year and the associated effects on recreation. Results for the end of May represent conditions soon after the Memorial Day holiday weekend, the traditional start of the peak boating season. Results for the end of June represent conditions just before the Independence Day holiday, which often is the highest use period of the year. Results for the end of August represent conditions just prior to the Labor Day weekend, after which recreation activity typically declines sharply.





Source: DWR 2004

**Figure 4.7-3. Modeled Lake Oroville elevation during peak recreation season under Existing Conditions, by water year type (average pool level).**

Effects on Boating

Drawdown affects the number of boat ramps and launch lanes available to boaters and the ease of use of the facilities. Both the number of ramps and the number of launch lanes available decreases with decreasing pool levels, with the major developed launch ramps narrowing in stages and each closing due to low water at different elevations. Pool elevations below 800 ft result in the most substantial effects, with 1 ramp closed and at least 16 of the 33 total launch lanes reservoir-wide unavailable.

The results of the hydrologic modeling described above indicate that the average pool elevation at the end of May would be 775 ft during critical years. This means that two of the five developed boat ramps on the reservoir would be closed from the start of the season or soon after. The average pool elevation on that date in other (wetter) years would be about 850 ft or higher, and effects on boat ramps would be minor. Modeling results for the end of June are similar to the end of May, with substantial effects on boat ramps only in critical years. The modeling for the end of August, however, indicates that baseline operations effects would include average pool elevations below 800 ft in below normal years and much below 800 ft during dry and critical years. Average pool elevation in above normal years is expected to be just slightly above 800 ft at that date.

Regarding low-water access, the ramps at Lime Saddle, Bidwell Canyon, and Spillway each provide boaters access to the water down to pool elevations between 702 and 695 ft msl. This means that boaters will have access to the water at these sites during all but the lowest low-water periods, which may occur during the late fall and winter during

droughts. The reservoir pool elevation fell below 700 ft for several weeks in late 2002 but prior to that had not been below 700 ft since March 1991. Each of these ramps provides 2 or 3 launch lanes at their lowest usable elevations.

The ramp at Loafer Creek primarily serves boaters camping at the Loafer Creek Campground and becomes unusable at the substantially higher elevation of 775 ft msl. This means the ramp is likely to be unavailable by mid to late summer during drier-than-normal years. When the ramp is closed, boating campers in the Loafer Creek area, the primary users of the ramp, can instead drive several miles to the Bidwell Canyon or Spillway ramps.

The remaining developed ramp, the Enterprise boat ramp, is a two-lane facility that primarily serves rural residents on the east side of the reservoir. The ramp closes below pool elevations of about 835 ft msl, which means the ramp is likely to be unavailable during part of the summer boating season, even during above normal water years. The ramp may be closed for all or most of the summer boating season during drier than normal years. When the ramp is closed, the primary users from the local rural area are required to drive a considerable distance to a ramp at the south end of Lake Oroville in order to launch their boat.

In addition to launch ramp and lane closures, low pool levels make use of most of the boat ramps more difficult by requiring boaters to walk long distances up and down the steep ramps between the water and their vehicles parked above. In particular, boaters using the Lime Saddle and Bidwell Canyon ramps, where low-level parking is limited or non-existent, complain about the long and steep walk to and from their vehicles from their boats when the pool level is low. Two other ramp conditions related to reservoir drawdown have also been a problem at times: mud and debris on the ramps, and floating boarding docks being partially or completely grounded as the reservoir reaches low water levels.

The car-top boat ramps (essentially old roads within the inundation zone) vary in respect to when pool elevation limits their use. This feature depends on the slope of the land and the length and condition of the old roads that provide access to the shore and water. The three ramps on the West Branch arm of Lake Oroville have steep shorelines, making hand launching difficult at low water levels and limiting other shoreline use. The Vinton Gulch and Nelson Bar Car-top BRs provide trailer launching only at high or moderately high pool levels (above 840–850 ft msl). These sites continue to provide some opportunity for hand launching of boats until the pool elevation falls below about 825 ft. Steep and rocky shorelines preclude use by boaters below that elevation. At the Dark Canyon Car-top BR, the access road runs for some distance along the side of Dark Canyon cove, providing opportunities for hand and trailer launching until the reservoir is below about 765 ft msl.

The gently sloped shoreline of the Foreman Creek Car-top BR attracts shoreline use by both boaters and non-boaters and the road extends far into Lake Oroville, providing launching opportunities even at low pool levels. However, the road may be covered by mud and debris at low pool elevations, and use of the area was observed to be low at

those times. Similarly, the abandoned road at the Stringtown Car-top BR extends far enough into the reservoir to be used for launching at low pool levels. The County road leading to Stringtown Car-top BR, however, is long and winding, and relatively few boats are launched in the area. The dominant use is by fishermen using small boats, and who generally fish in nearby parts of the reservoir. (A sign stating that trailer launching is prohibited is posted at the turnoff to the Stringtown Car-top BR.)

In addition to the facility-related effects, drawdown can affect the recreational experience of boaters while out on the reservoir. Although crowding has generally not been found to be a problem on Lake Oroville, the surface area available for boaters to use decreases as the pool level falls. At 800 ft elevation, the reservoir has about 11,250 surface acres, nearly a 30 percent decrease from full pool. As the reservoir shrinks, coves favored by houseboaters and others for anchoring and mooring to the shoreline, and for water-skiing and similar sports, become gradually dewatered. This increases competition among boaters for these sites, which may become a greater concern only during years when severe drawdown occurs during the peak summer boating season. Declining water levels also increase the number of outcrops and other such obstructions at or near the surface, which limits boating activity in some areas. For safety, hazards in high-traffic areas are marked with buoys and a 5 mph boat speed limit is imposed within 200 ft of shore (reservoir-wide) year round.

#### Effects on Angling

Effects of project operations on reservoir boating, as discussed above, also apply to angling to a large degree in that most angling in the area (with the exception of angling on the Feather River) occurs from boats. Therefore, drawdown has effects on fishing at Lake Oroville to the extent that boater access is affected. However, angling activity at Lake Oroville, including major fishing tournaments, peak during the fall and spring and usually does not appear to be greatly affected by the typically low, off-season pool levels. The typically reduced number of launch lanes available during those seasons has generally not been a major impediment to these events, except during the most extreme low water conditions. (For example, a tournament was held November 23, 2002, at the Bidwell Canyon boat ramp when the reservoir pool elevation was below 700 ft msl.) Although conflicts may occur if few launch lanes are usable, relatively few pleasure boaters use the launch facilities during the non-summer months, reducing competition for use of the ramps and potential conflicts.

Effects of drawdown on bank fishing may be greater, in that low water levels make the shoreline less accessible in most areas. However, at a few locations on Lake Oroville, a moderate degree of drawdown leads to more exposed and accessible shoreline for bank fishing that at high water levels is not available or is difficult to reach.

#### Effects on Shoreline Use and Swimming

The Oroville Facilities are located in a region with hot summer temperatures, and often warm temperatures in the late spring and early fall, which helps make swimming an activity much in demand. Lake Oroville has one developed swim area at Loafer Creek,

but much of the swimming activity is more informal in nature. Swimming activity often occurs at the same locations and in conjunction with other shoreline-based day use activities such as picnicking, sunbathing or relaxing in the shade, and bank fishing.

The swim beach and associated facilities at the Loafer Creek DUA are used by both day users and campers staying at the nearby Loafer Creek camping facilities. The area receives heavy use during periods of high reservoir water levels; however, the beach becomes unusable as designed when the reservoir is more than about 50 ft below full pool. Historically, this has meant that the beach has not been usable at all during the summer some years and has been unusable a large part of the summer most years.

Several other small day use facilities without swim beaches exist at Lake Oroville, generally in association with boat ramps, and each with picnic tables, grills, and shade structures or trees. Lake Oroville visitors also use the car-top boat ramp areas as informal swimming and day use areas. Several of these become more usable by swimmers, picnickers, anglers, and others as reservoir level decreases, exposing more usable shoreline. Visitors have expressed demand for additional developed shoreline access sites, but reservoir drawdown combined with steep shoreline slopes is a severe constraint on such additions.

Shoreline use by swimmers, anglers, and others becomes more difficult and less enjoyable as the pool level decreases due to the primarily steep and muddy shorelines in most areas. A moderate level of drawdown has beneficial effects at Stringtown Car-top BR, because it provides areas of shoreline for parking and recreation use, whereas very little shoreline is accessible or useable at reservoir elevations near full pool.

#### Effects on Camping

With the exception of boat-in camping, most camping is not directly affected by reservoir drawdown. Only the Bidwell Canyon Campground provides sites close to the shoreline. Shoreline use in that area becomes difficult or undesirable due to steep and muddy conditions as the pool elevation falls more than about 50 ft below full pool. Campers at the Lime Saddle and Loafer Creek Campgrounds may hike to the shoreline near the campgrounds, and would also find the shoreline areas increasingly less favorable for use as the pool level falls.

Regarding boat-in camping, at moderate and low water levels the campsites can be a significant distance from the water. Routes from the shoreline to the campsites through the fluctuation zone become lengthy and steep, making these campsites less attractive. Therefore, boat-in campgrounds are generally more popular when the reservoir level is high and become generally unused as the reservoir level drops more than 50–70 ft below full pool (830–850 ft msl).

The aesthetic experience of floating campsite users can be negatively affected by drawdown because of the exposed shoreline that becomes a dominant aspect of the visual setting. Access to the floating campsites is not usually affected by drawdown during the majority of the recreation season. (Other aesthetic effects of reservoir

drawdown that may affect the enjoyment of visitors to Lake Oroville are discussed in Section 4.11.1, Visual Resources.)

#### Effects on Trails

Access to trails or trailheads is not generally affected by reservoir drawdown; however, some trail users would like to have more trails that provide access to the water, which currently is only provided by a few trails when the reservoir is at or near full pool. Additional access may be difficult or infeasible due to changing water levels. Additionally, the aesthetic effect of drawdown can affect the recreational setting for trail users using shoreline trails and therefore affect the recreational trails experience.

#### Lake Oroville Temperature Effects

As with most deep lakes and reservoirs in areas with temperate climates, Lake Oroville stratifies thermally each year, meaning that warmer waters are located near the surface and colder waters are located at depth. This two-layered system provides an opportunity for both a coldwater fishery (e.g., salmon and trout) and warmwater fishery (e.g., black bass, catfish) to flourish. The warmer waters at the surface, which are generally in the high 70s to mid 80s (°F) during the summer, provide good conditions for swimming and other water-contact recreation such as water-skiing, wake-boarding, and riding PWC.

#### Thermalito Afterbay Pool Fluctuation Effects

Overall, the surface elevation fluctuates much less at Thermalito Afterbay than at Lake Oroville. The pool elevation fluctuates as much as 4–6 ft on a weekly basis due to project operations, with a rapid drawdown and the lowest elevations typically occurring during weekends. The changes in elevation follow a weekly cycle dictated by hydroelectric power operations and can generally be characterized by a gradual increase in elevation from Monday through Friday followed by a more rapid decrease in elevation during the weekend. The typical 24-hour elevation gain is about 1 ft; the typical 24-hour elevation loss is about 2 ft. Most weeks, the range in elevation is about 3–4 ft. Fluctuations are similar during wetter-than-normal and drier-than-normal years, although weekly fluctuation during dry years may be slightly greater, in the range of 3–6 ft.

#### Effects on Boating

Stakeholder input indicates that the low pool levels can cause concerns for boaters using the Thermalito Afterbay boat ramps, particularly when the water level approaches the toe of the ramps. Low water levels also create a risk of grounding or stranding of boats in shallow areas.

### Effects on Angling

Angling may be affected to some degree by daily or weekly changes in elevation or temperature changes that affect the fisheries or their reproduction in Thermalito Afterbay, which can in turn affect angling success rates.

### Water Temperature Effects Downstream of Lake Oroville

The temperature of the water in the Feather River is regulated during much of the year by drawing of water from lower, colder strata of Lake Oroville. DWR is required to control water temperatures in the river to meet the needs of the Feather River Fish Hatchery and steelhead trout and spring-run Chinook salmon. At mile 61.6 of the LFC, the average daily water temperature is required to be less than or equal to 65°F during the months of June through September. A 1983 agreement between DWR and DFG specifies water temperature objectives for the Feather River Fish Hatchery ranging from 55°F to 60°F through the summer months. As a result of these requirements, water temperatures are cold year round in the reservoirs and in the Feather River downstream of Lake Oroville.

Water temperatures are generally uniformly cold in the Diversion Pool and most of Thermalito Forebay, rarely rising above 60°F during the summer. Surface water temperatures in the shallow swim cove where a beach is located can rise into the low 70s, although the water a meter or more below the surface remains at temperatures similar to the main pool of the forebay. Thermalito Afterbay water temperatures can vary widely. Summer water temperatures are in the low 60s near the tailrace channel where water enters the pool, in the 70s in areas near the outlet to the river, and in the mid 80s in the backwater areas that do not readily circulate (DWR 2001b).

### Effects on Swimming

The cold water temperatures in the Diversion Pool and Feather River (generally from the upper 50s to mid 60s) can make swimming unattractive for most people. No swimming was observed in the Diversion Pool and little was observed in the Feather River during the study period. Prior to construction of the Oroville Dam, summer water temperatures in this area reached 70–75°F, and swimming was a popular activity. Currently, most of the visitors entering the river are wading anglers.

The cool water temperatures in most of Thermalito Forebay and Thermalito Afterbay reduce the desirability of the water for swimming but, as noted above, some warming of the water does occur in certain areas and several swim beach locations receive substantial use. The substantially warmer water at the North Forebay DUA swim beach, in particular, makes that area very popular with swimmers.

Swimming and water-skiing are popular summer activities at Thermalito Afterbay although water temperatures are less than ideal in some areas, with the warmest waters accessible to most pleasure boaters and skiers reaching the low 70s.

### Effects on Angling

Changes in temperature that affect fish populations would also affect fishing success, and subsequently affect the fishing experience. The cold water temperatures of the downstream reservoir and the Feather River support well-utilized coldwater fisheries in all of these areas. The diverse temperature structure of Thermalito Afterbay provides suitable habitat for both warmwater and coldwater fish, including a popular largemouth bass fishery.

### Low Flow Effects on the Feather River

The Feather River in the project area consists of two sections: the upper reach, also referred to as the LFC, from the Thermalito Diversion Dam to the Thermalito Afterbay Outlet, and the lower reach, downstream of the Thermalito Afterbay Outlet. The LFC generally has a flow rate of 600–700 cubic feet per second (cfs) (600 cfs is the required minimum for fisheries purposes) at most times, although flows may be much higher during the winter and spring of wetter-than-normal years, as water is released from Lake Oroville for flood control purposes. High volumes of water will also be carried in the LFC during actual flood events. Flows in the lower reach are more variable with the lowest flows (about 2,000–4,000 cfs) occurring during the fall and winter in most years and higher flows (5,000–8,000 cfs) occurring during the mid and late summer. Wetter-than-normal years will result in higher late winter and spring flows (6,000–12,000 cfs), while critical years will result in reduced flows (1,500–3,000 cfs) throughout the year.

### Effects on Boating

Effects on boating occur but are not common on this portion of the Feather River. The low flows in the LFC reduce navigability, particularly for jet boats and other powered watercraft, because of shallows and riffles created by the low flows and growth of aquatic weeds. Conversely, low flows may make boating easier for novice paddlers and fishing boats wishing to anchor in the river. Paddlers who find shallows and riffles to be a barrier to navigation or who desire a more challenging paddle would have their enjoyment increased with greater flows. In the lower reach, the greater flows increase navigability. Very high flows may make boating more challenging; however, field observations suggest that anglers who boat on the river during the prime late-summer and fall fishing season are not deterred from using this very popular fishery resource during high flows.

### Effects on Angling

The primary potential effect of low flows on recreation results from potential adverse effects on the coldwater fishery in the river, which is the major focus of most recreation activity there. However, wading by anglers in the river, which is a common angling technique, is made easier by the stable low flows. In the lower reach, the greater flows make wading more difficult in deeper areas. Wading anglers tend to adjust to the higher flows by staying in shallower water or by fishing from the bank or gravel bars.